Remarks

Reconsideration of this application as amended is respectfully requested.

Claims 1-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,346,445 of *Leuenberger et al.* ("*Leuenberger*") and U.S. Patent No. 5,566,180 of *Eidson* ("*Eidson*").

Applicants respectfully submit that amended claim 1 is not obvious in view of *Leuenberger* and *Eidson*. Amended claim 1 is a motion control system that includes the limitations

> a set of control nodes each corresponding to an axis of the motion control system each control node having a clock and each control node maintaining a synchronized time among the clocks and each applying a corresponding control value to an actuator for the corresponding axis when a trigger time for the corresponding control value matches the synchronized time in the corresponding clock.

(Amended claim 1) (Emphasis added).

The combination of *Leuenberger* and *Eidson* does not teach or suggest applying a control value to an actuator when a trigger time for the control value matches a synchronized time as claimed in amended claim 1. *Eidson* discloses methods for clock synchronization but does not disclose or suggest applying a control value to an actuator when a trigger time matches a synchronized time as claimed in amended claim 1. *Leuenberger* discloses a system in which control values are applied to an actuator after a delay circuit time out (*Leuenberger*, col. 11, lines 11-13 and 19-20) rather than when a trigger time matches a synchronized time held in a clock as claimed in amended claim 1.

In further contrast, the master clock of *Leuenberger* does not generate a time value as does the clock of amended claim 1. Instead, the master clock of *Leuenberger* generates motor pulses (*Leuenberger*, col. 11, lines 35-37).

Moreover, the synchronizing clock of *Leuenberger* does not generate a time value as does the clock of amended claim 1. Instead, the synchronizing clock of *Leuenberger* generates clock pulses (*Leuenberger*, col. 11, lines 62-64).

Furthermore, *Leuenberger* does not teach or suggest a combination with *Eidson* and *Eidson* does not teach or suggest a combination with *Leuenberger*.

Given that claims 2-5 depend from amended claim 1, it is submitted that claims 2-5 are not obvious in view of the references cited by the Examiner.

It is also submitted that amended claim 6 is not obvious in view of *Leuenberger* and *Eidson*. Amended claim 6 includes limitations similar to the limitations of amended claim 1. Therefore, the remarks stated above with respect to amended claim 1 also apply to amended claim 6.

Given that claims 7-10 depend from amended claim 6, it is submitted that claims 7-10 are not obvious in view of the references cited by the Examiner.

It is further submitted that amended claim 11 is not obvious in view of *Leuenberger* and *Eidson*. Amended claim 11 is a motion control system that includes limitations similar to the limitations of amended claim 1. Therefore, the remarks stated above with respect to amended claim 1 also apply to amended claim 11. In addition, amended claim 11 includes the following limitations

> selector node that determines a motion control function to be applied to the axes by transferring a message to each control node that specifies the control value to be applied by each control node.

(Amended claim 11).

Neither *Leuenberger* or *Eidson* teach or suggest a selector node as claimed in amended claim 11.

Given that claims 12-17 depend from amended claim

11, it is submitted that claims 12-17 are not obvious in view of the references cited by the Examiner.

It is respectfully submitted that in view of the amendments and arguments set forth above, the applicable objections and rejections have been overcome.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 50-1078 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

Date: 7-1-02 By: _____

Paul H. Horstmann
Reg. No.: 36,167

Version with Markings to Show Changes Made

1. A motion control system having a set of control nodes each corresponding to an axis of the motion control system, each control node having a [synchronized] clock and each control node maintaining a synchronized time among the clocks and each applying a [series of] corresponding control value[s] to an actuator for the corresponding axis when a trigger time for the corresponding control value matches the synchronized time in the corresponding clock [such that the control nodes coordinate application of the control values to the actuators using the synchronized clocks].

2. The motion control system of claim 1, wherein each control node participates in a protocol for synchronizing the [synchronized] clocks via a communication link.

3. The motion control system of claim 1, wherein each control node associates [each] the corresponding control value [of the corresponding series of control values to be applied to the corresponding actuator] to [a] the corresponding trigger time [value] according to a motion control function for the corresponding axis.

4. The motion control system of claim 3, wherein each control node includes means for triggering [triggers] an application of [each] the corresponding control value to the corresponding actuator in response to the corresponding trigger time and the synchronized time [when the corresponding time value equals a time provided by the corresponding synchronized clock].

6. A control node for a motion control system, the

control node having a [synchronized] clock and maintaining a synchronized time in the clock and having means for applying a [series of] control value[s] to an actuator for [a corresponding] an axis of the motion control system when a trigger time for the control value matches the synchronized time in the clock [such that the application of the control values to the actuator is coordinated using the synchronized clock].

7. The control node of claim 6, further comprising means for participating in a protocol for synchronizing the [synchronized] clock via a communication link.

8. The control node of claim 6, further comprising means for associating [each] the control value [to be applied to the actuator] to [a] the trigger time [value] according to a motion control function for the [corresponding] axis.

9. The control node of claim 8, further comprising means for triggering an application of [each] the control value to the actuator in response to the trigger time and the synchronized time [when the corresponding time value equals a time provided by the synchronized clock].

10. The control node of claim 6, further comprising a set of processing resources which are scaled according to a motion control function for the [corresponding] axis.

11. A motion control system, comprising:

a set of control nodes each corresponding to an axis of the motion control system, each control node having a [synchronized] clock and each control node maintaining a synchronized time among the clocks and each applying a corresponding [series of] control value[s] to an actuator

for the corresponding axis when a trigger time for the corresponding control value matches the synchronized time in the clock [such that the control nodes coordinate application of the control values to the actuators using the synchronized clocks];

selector node that determines a motion control function to be applied to the axes by transferring a message to each control node that specifies the [series of] control value[s] to be applied by each control node.